Positive ecosystem changes on Anacapa Island from rat eradication

By Kate Faulkner, Gregg Howald, and Steve Ortega

THE MOST IMPORTANT step for the restoration of the Anacapa Island ecosystem at Channel Islands National Park, California, was removing black rats (*Rattus rattus*). The exotic rats threatened and preyed upon native species. Beginning in 2001 and continuing the next year, the National Park Service and its partner in the restoration project, Island Conservation and Ecology Group, applied rodenticide to Anacapa Island, as described in *Natural Resource Year in Review—2001* and *2002*. The natural recovery and restoration of the Anacapa ecosystem since eradication have been dramatic, with many rapid, positive changes in native wildlife populations.

A video camera documents a black rat preying on an artificial "bird nest" on Anacapa Island (above, left). Investigators deployed artificial nests, consisting of a brown chicken egg and a plasticine egg, around the island to monitor the presence of rats and to track rates of nest depredation. To mimic Xantus's murrelet nests, investigators placed eggs in rocky crevices, under boulders, and beneath shrubs. They determined the cause of predation by comparing chew marks of known nest predators with marks left on plasticine eggs. Xantus's murrelet eggs that have been found on Anacapa in recent years are few in number and have had large bite marks (top) in the shells that are consistent with rats.

- **Seabirds**
  Within four months of the fall 2002 rodenticide baiting treatment, biologists detected the highest numbers of cavity-nesting seabirds ever recorded successfully breeding on the island. For the first time in decades, rare Xantus's murrelets (*Synthliboramphus hypoleucus*) nested in areas from which rats had previously excluded them. Nesting activity of Xantus's murrelets in 2003, measured using boat-mounted radar, increased by 58% to 200% compared with the prior three years. In addition, two downy Cassin's auklet chicks, a new species for the island, were unexpectedly discovered in what was previously prime rat habitat.

- **Anacapa deer mice**
  Populations of the endemic Anacapa deer mouse (*Peromyscus maniculatus anacapae*) have increased dramatically on east Anacapa, the first of the Anacapa islets from which rats were eradicated in November 2001. Considering that rats had extirpated the native deer mice from east Anacapa, to have the mice present in such high numbers is a spectacular change to that ecosystem. Project staff released wild captive deer mice onto middle and west Anacapa in April 2003 (the spring following the eradication treatment). The mice are reproducing, and population increases are surpassing those measured on east Anacapa the prior year.

- **Birds of prey**
  Birds of prey were at risk of secondary exposure to the rodenticide from preying on or scavenging poisoned rats and nontarget Anacapa deer mice. To avoid exposure, biologists live-captured or translocated as many birds of prey as possible. Currently the diversity and numbers of birds of prey on Anacapa are similar to those before the rat eradication.

The final determination that all rats have been eradicated from Anacapa will not be made until fall 2004 following two years of post-project monitoring. However, the dramatic changes in the ecosystem, coupled with no sign of rats, are early indications of a successful conservation project. Monitoring will continue for a number of years to more fully understand the response of the ecosystem following removal of nonnative rats. ■

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